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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,675	03/18/2004	Michael Degner	81095340 (FGT 3F3B)	8003
36865 7590 08/23/2007 ALLEMAN HALL MCCOY RUSSELL & TUTTLE, LLP 806 S.W. BROADWAY, SUITE 600 PORTLAND, OR 97205			EXAMINER PATEL, DHARTI HARIDAS	
			ART UNIT 2836	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/804,675

Applicant(s)

DEGNER ET AL.

Examiner

Dharti H. Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11-24, 26 is/are rejected.
- 7) ☒ Claim(s) 25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 07/16/2007.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-9, 11-24, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuehn, III, Patent No. 3,884,207.

With respect to claim 1, Kuehn discloses an electronic circuit [Fig. 1], comprising a first electromechanical actuator coil [Fig. 1, 36] coupled to a cylinder valve of an internal combustion engine [col. 3 lines 30-31], a second electromechanical actuator coil [Fig. 1, 38, col. 3 lines 31-32], where a first end of said second electromechanical actuator coil [Fig. 1; one end of coil 38 that is connected to node 44] is coupled to a common reference [Fig. 1, common terminal 44] with a first end of said first electromechanical actuator coil [Fig. 1; one end of coil 36 that is connected to node 44]; a first energy storage device [Fig. 1, 46], where a first end of said first energy storage device is coupled to said common reference [Fig. 1; - terminal of capacitor 46 is coupled to a common reference 44 via PD 56]; and a second energy storage device [Fig. 1, 48], where a first end of said second energy storage device is coupled to said common reference [Fig. 1; - terminal of capacitor 48 is coupled to a common reference 44 via PD 58], and wherein a charge balance is maintained on said first and second energy storage devices [Fig. 1; capacitors 46 and 48 maintain a balance of charge between them depending on which of switches 26 or 30 is closed or open, by passing charge

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back and forth during the appropriate alternation of flywheel 12 (col. 6 line 35-40).

Capacitors 32 and 34 also meet this limitation since they similarly maintain a balance of charge between them by draining off switching arcing energy, depending on which of switches 26 or 30 is closed or open (col. 3 lines 10-17)].

With respect to claim 2, Kuehn discloses that the first energy storage device is a first capacitor [Fig. 1; 46; col. 3 lines 37-40].

With respect to claim 3, Kuehn discloses that the second energy storage device is a second capacitor [Fig. 1; 48; col. 3 lines 40-42].

With respect to claim 4, Kuehn further comprises a voltage source [Fig. 1, 46; col. 4 lines 1-4], with a first end of said source coupled to a second end of said first energy storage device [Fig. 1; + terminal of voltage source is coupled to the + side of the capacitor 46].

With respect to claim 5, Kuehn discloses that a second end of said source is coupled to a second end of said second energy storage device [Fig. 1; - terminal of voltage source 46 is coupled to a second end (- terminal of capacitor 48) terminal of said second energy storage device 48].

With respect to claim 6, Kuehn further comprises a first one-way current device [Fig. 4; diode connected between lines 22 and 24], with a first end of said one way current device coupled to a second end of said first electromechanical actuator coil [Fig. 1; node 40 is the second end of the first actuator coil 36, which is connected to the cathode side of diode].

With respect to claim 7, Kuehn further comprises a second one-way current device [Fig. 4; diode connected between lines 22 and 28], with a first end of said one way current device coupled to a second end of said second electromechanical actuator coil [Fig. 1; node 42 is the second end of the second actuator coil 38, which is connected to the cathode side of diode].

With respect to claim 8, Kuehn further comprises a first switch [Fig. 1, 26] for actuating said first electromechanical actuator coil [Fig. 1, 36]; and a second switch [Fig. 1, 30] for actuating said second electromechanical actuator coil [Fig. 1, 38].

With respect to claim 9, Kuehn discloses a system [Fig. 1], comprising a dual-coil half bridge [Fig. 1; consists of coils 36 and 38; col. 3, lines 30-32] converter adapted to be coupled to a single or multiple coil actuator of a cline valve, the cylinder valve in an internal combustion engine [col. 2 lines 42-46], the converter having a first [Fig. 1, 46] and second [Fig. 1, 48] capacitor and a voltage source [Fig. 1, 46, col. 4, lines 1-4], with at least one end of each of the first and second capacitors coupled to a common reference [Fig. 1, first ends of the coils 36 and 38 are connected to the common reference node 44], the converter actuated via switches [Fig. 1, switches 26 and 30] to individually energize coils in said dual coil actuator, wherein at least one end of said actuator is coupled to said common reference, and wherein said dual-coil half bridge converter maintains a charge balance on said first and second capacitors [Fig. 1; capacitors 46 and 48 maintain a balance of charge between them depending on which of switches 26 or 30 is closed or open, by passing charge back and forth during the appropriate alternation of flywheel 12 (col. 6 line 35-40)].

With respect to claim 11, Kuehn discloses that the converter is adapted to be coupled to a plurality of engine cylinder valves [Fig. 1, cylinders A and B; col. 3 lines 30-32].

With respect to claim 12, Kuehn discloses that the dual coil half bridge converter [Fig. 1; consists of coils 36 and 38] maintains a charge balance on said first and second capacitor [Fig. 1, capacitors 46 and 48] even when at least one cylinder of the engine is deactivated while at least one other cylinder carries out combustion [Fig. 1; capacitors 46 and 48 maintain a balance of charge between them depending on which of switches 26 or 30 is closed or open, by passing charge back and forth during the appropriate alternation of flywheel 12 (col. 6 line 35-40)].

With respect to claim 13, Kuehn discloses that the capacitors form a dual voltage source [col. 4 lines 1-9].

With respect to claim 14, Kuehn discloses that the dual coil half bridge converter is adapted to be coupled to at least two dual coil actuators [Fig. 1; consists of two coils 36 and 38] of two cylinder valves [Fig. 1, cylinders A and B], wherein the converter is configured to balance voltage of said first and second capacitor [col. 4 lines 10 - 53].

With respect to claim 15, Kuehn discloses a dual coil half bridge power converter system, comprising a power source [Fig. 1, 46]; a single or multiple coil actuator of a cylinder valve [Fig. 1; cylinder valves A and B; col. 2, lines 43-46, lines 55-57], the cylinder valve in an internal combustion engine [col. 2 lines 43-46], only one actuating switch [Fig. 1, 26] for actuating each coil [Fig. 1, coils 18 and 20] in said actuator; and

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an energy storage device [Fig. 1, 46; col. 3 lines 38-42] for storing energy during deactivation of at least one coil [col. 3, lines 12-17].

With respect to claim 16, Kuehn further comprises a unidirectional current device [Fig. 4, upper diode] for allowing freewheeling current during deactivation of at least one coil [Fig. 1, Fig. 1, 18].

With respect to claim 17, Kuehn discloses that the storage device includes two capacitors in a split voltage power supply topology [Fig. 1, 32 and 34].

With respect to claim 18, Kuehn discloses that the energy storage device includes two capacitors [Fig. 1, 32 and 34] in a boosted power supply topology.

With respect to claim 19, Kuehn further comprises a plurality of dual coil actuators of cylinder valves of an engine [col. 2, lines 43-46, lines 55-57], and only one actuating switch [Fig. 1, 26] coupled to each coil [Fig. 1, coils 18 and 20] of said plurality of coils [Fig. 1, 18 and 20].

With respect to claim 20, Kuehn discloses a system [Fig. 1] comprising a power supply [Fig. 1, 46; col. 4 lines 1-4] with a positive and negative terminal; a first coil [Fig. 1, 36] coupled to a cylinder valve [Fig. 1; cylinder valve A; col. 3 lines 30-31] actuator of an engine, said first coil having a first end and a second end [Fig. 1; coil 36 has two ends]; a first switch [Fig. 1, 26] coupled between a first end of said first coil and said positive terminal of said power supply [Fig. 1; one end of switch 26 is coupled to a first end of the first coil 36 at the common reference 44; and the other end of switch 26 is coupled to the positive terminal of 46]; a first capacitor [Fig. 1, 46] coupled between said positive terminal of said power supply and said second end of said first coil [Fig. 1;

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capacitor 46 is coupled between + terminal and node 40 of the first coil 36]; a first diode [Fig. 1; diode connected between lines 22 and 24] coupled between said first end of said first coil [Fig. 1; node 44] and said negative terminal [Fig. 1, 28]; a second coil [Fig. 1, 38], said second coil having a first end and a second end, said first end of said second coil [Fig. 1; at node 44] coupled to said second end of said first coil; a second capacitor [Fig. 1, 48] coupled between said first end of said second coil and said negative terminal [Fig. 1; anode of the diode is connected at node 44 and cathode is connected at the negative terminal 28]; a second switch [Fig. 1, 30] coupled between said second end of said second coil and said negative terminal [Fig. 1; switch 30 is coupled between negative terminal 28 and second coil 38]; and a second diode [Fig. 1, diode connected between 28 and 22] coupled between said second end of said second coil and said positive terminal [Fig. 1; second diode is coupled between node 42 and the positive terminal 24].

With respect to claim 21, Kuehn discloses that the negative terminal of said power supply is coupled to a ground [Fig. 1, - polarity is usually negative power or ground].

With respect to claim 22, Kuehn discloses that the switches [Fig. 1, 26 and 30] control actuation of at least one cylinder valve of an internal combustion engine [col. 3 lines 12-15, lines 65-68].

With respect to claim 23, Kuehn discloses that the second coil [Fig. 1, 18] is coupled to said cylinder valve actuator [Fig. 1; col. 2 lines 43-46].



With respect to claim 24, Kuehn discloses that the second coil [Fig. 1, 20] is coupled to another cylinder valve actuator of said engine [Fig. 1; col. 2 lines 43-46].

With respect to claim 26, Kuehn discloses that the second end of said first coil is coupled to ground [Fig. 1; second end at node 40 is coupled to the common reference node 40 through PD 56].

### ***Allowable Subject Matter***

Claim 25 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for indicating allowance of claim 25: The prior art does not disclose that the system further comprises third and fourth coils, wherein said system is configured to balance voltage across said first, second, third, and fourth coils. This feature in combination with the rest of the claim limitations is not anticipated or rendered obvious by the prior art of record.

### ***Response to Arguments***

Applicant's arguments filed 07/06/2007 have been fully considered but they are not persuasive.

Applicant comments on page 8 of the Remarks that Kuehn does not disclose an electronic circuit where a charge balance is maintained between first and second energy storage devices. However, Kuehn teaches this limitation in col. 6 lines 35-40. See above rejection of claim 1.

Applicant comments on pages 9 and 11 of the Remarks regarding claims 1 and 20 that Kuehn does not disclose that a first electromechanical actuator coil is coupled to a cylinder valve of an internal combustion engine. Examiner points out that the first electromechanical actuator coil 38 is coupled to a cylinder valve A in Fig. 1 of an internal combustion engine. See above rejection.

Applicant comments on page 12 of the Remarks regarding how the diode circuit in Fig. 1 may be connected to the circuit shown in Fig. 1. The diode circuit in Fig. 1 is connected between the terminals 24 and 28. These terminals are also connected through two coils 36 and 38, two switches 26 and 30. Two diode of Fig. 4 would connect in parallel to coils 36 and 38. Therefore, Fig. 4 combined with Fig. 1 meets the limitation of "a first diode coupled between said first end of said first coil and said negative terminal" and "a second diode coupled between said second end of said second coil and said positive terminal." See above rejection of claim 20.

Based on examiner's best understanding, it is believed that the prior art reference by Kuehn reads on the amended claim language of independent claims 1 and 9, and also 15 and 20.

### ***Conclusion***

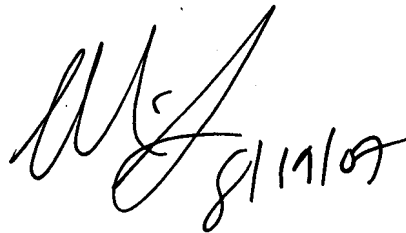
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dharti H. Patel whose telephone number is 571-272-8659. The examiner can normally be reached on 7:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on 571-272-2800, Ext. 36. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dharti H. Patel/  
GAU 2836  
08/08/2007

A handwritten signature in black ink, appearing to read 'MS' followed by a date '8/11/07'.

MICHAEL SHERRY  
SUPERVISORY PATENT EXAMINER